

Statistics in the Administration Of a State Health Department

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A recent issue of the *Harvard Business Review* contains an article on the relations between management and professional employees (1). The principal difficulty in these relations seems to stem, according to the author, from three facts: that management and professional employees rarely have the same objectives in view in pursuing their endeavors, that management and professional employees either do not speak the same language or speak different vernaculars of the same language, and that, because of the first two facts, there is considerable blocking in communications between the two.

My observations suggest that much the same factors form the basis of the problem in the use of statistics in public health. It is necessary to strike at the root of these difficulties and to devise methods by which the objectives of statisticians and public health administrators can be reconciled, their languages unified, and their communications made facile and two-directional.

It seems to me that State health departments provide, perhaps more than any other work center, an area in which understanding is too frequently absent and most vitally needed. In speaking for the health officer, may I recite his objectives, indicate his problems, and suggest how statisticians may help him with his solutions.

Dr. Porterfield, director of health of the Ohio Department of Health, presented this paper at the Second Conference on Public Health Statistics, School of Public Health of the University of Michigan, Ann Arbor, June 20.

Why a State Health Department?

Although 48 versions could perhaps be obtained on the reasons for the existence of a State health department, I offer my concept.

Standards

The first objective should be to determine standards of performance and achievement. In most instances, by State law, the State health department has the responsibility for establishing a minimum code or body of regulations which must be met by the local health units within the State however far beyond them their own inclinations and abilities may lead. Even where a minimum code is not a statutory requirement, the State health department is in the best position to develop and establish goals for the local health units of that State.

These standards may be as exact and measurable as the values of sensitivity and specificity requirements of an approved serologic laboratory or the number of days of isolation to be imposed upon a specific communicable disease. They may be as intangible—in our present knowledge—as the optimum time of a home nursing visit or the best ratio of public health personnel to population served. And they may be anything between. The State health department should have the time and the highly trained personnel to devote to investigation, to testing, and to determination of a set of values which can be used as a guide by local health units in meeting their community problems.

This activity of a State health department is not restricted to the formation of a State sanitary code containing the minimum require-

ments or standards of laboratory performance and communicable disease control. It includes the positive approach to a set of desirable values covering the whole range of local health unit operation—financing, staff, program content, methodology, and achievement. These desirable values may not always be set out as requirements, but they serve a useful purpose as bench marks.

Local Assistance

The second objective of a State health department, in my concept, is to assist local health units in meeting these standards. The methods of such assistance are legion and include such things as guidance, consultation, the exchange of information, the provision of highly specialized or expensive personnel and facilities for periodic or continued cooperative use of local health units, financial assistance in the way of supplementation of local budgets with either State or Federal grants-in-aid, and finally, and least exploited to date, the objective analysis of the current performance and achievement of local health units in comparison with State averages and with the standards developed by the State department.

Direct Service

The third objective I put last intentionally. The department must perform those direct health services for the population of its State dictated by the statutory charges made by the State legislature. While there is wide variation from State to State in these assignments, it is becoming more capably demonstrated every year that direct services of a State health department should be confined to the type of work that can be done more effectively on a state-wide than on a community basis.

There probably are not too many of these services. One example of the type of program which is not too susceptible to delegation as a local health unit responsibility is water pollution control. This work must generally be done in terms of drainage areas since streams and rivers have given little thought in their meanderings to the local jurisdictional lines that may be crossed. Control of surface water pollution is not quite as closely distributed in population profiles as is, let us say, communicable disease

control. There may be other and perhaps even more appropriate instances of direct health services which can be better performed by State health departments than by local health units. But their number is limited.

Use of Statistics

If these, then, are the reasons for the existence of a State health department, how can statistics be used in meeting these objectives? It seems apparent that the first objective, the determination of standards, must depend heavily upon the use of statistical tools and the proper treatment of the proper data to arrive at satisfactory conclusions and recommendations. Scientific research in the sense of establishing new knowledge in the scientific field is probably not a primary function of a State health department, although there are some that indulge in this activity to a greater or lesser extent. Applied research certainly is necessary, and the most neglected field of applied research is in administration methods. Granting that a program director knows intimately the scientific details of the field wherein he works, there is still considerable room for investigation into methods by which scientific knowledge can be used to help the population aggregates which have the problems.

Obviously, it is necessary at the very beginning to measure the extent and distribution of the public health problems. Just as obviously, the trial and error method of developing satisfactory solutions to these problems is expensive and time consuming. Knutson in *Public Health Reports* has presented articles on the pre-evaluation of proposed health education programs (2, 3). This is a type of study which cries for extension to the other special areas of public health.

An indispensable feature of investigations leading to recommended standards is the development of reasonably precise methods of measurement which can be applied to the observations made. The venereal disease control officer may know that the epidemiological work of contact tracing and examination is as important as the treatment of diagnosed cases of infectious syphilis. But to develop a standard for performance of this phase of the program,

he must join his knowledge of the epidemiological ramifications of syphilis with the statistician's ability to plan for accumulation of valid and uniform data if he is to be able finally to recommend that at least one contact be found and examined for every case diagnosed. Note that this standard is not purely the outgrowth of his epidemiological knowledge but is tempered by the findings of the statistician as to what common experience and achievement are.

In any development of standards, it is necessary that a continuing process of comparison of the current standards with results achieved must be maintained so that the standards are not alone ideal, but are also practical and attainable. This process cannot be accomplished without the initial development of means of data collection and result measurements. And, finally, under this heading, it is a necessary but too often forgotten requirement that continuing data collections after the original establishment of standards be at the minimum essential for proper control and should never be above the minimum purely for data collection. Only a statistician and a program chief in complete cooperation can make those determinations.

Problem Measurement

That brings us, of course, to the second objective—the assistance of local health units in meeting the established standards. Here we must have careful and current problem measurement—not only natality and mortality, but also the causes of mortality and the measurement of morbidity. We must have effective means of comparing performance with the standards, remembering that not only performance, but also the standards themselves can change. And we must have some measurement of the effectiveness of methods used in our programs. Examples in practice are the percentage of yield in case-finding programs and the comparison of cases reported with deaths reported from specific cause.

A State health department has or should have a considerable body of consultants—who spend their time consulting. Now a consultant's visit is always valuable to a local health unit if he is able to bring the news, the trials and errors and solutions of other units with similar prob-

lems. The visit is valuable if the consultant has the proper and adequate amount of training, experience, and ability to communicate so that his fund of knowledge is useful to the local personnel. The visit is twice as valuable if the suggestions and recommendations are framed to the specific problems, needs, and resources of the unit visited. And this double value can be provided if the consultant has had the opportunity before the visit to review the proper data collected from the unit and the analyses and interpretations which have been made of the data.

One of the most effective means of drawing a local health officer's attention to the needs of his tuberculosis control program is to show him the ratio of cases found to cases first reported by death certificate. We have found it to be impressive when we can show a local health officer not only his area's infant death rate compared to the other areas of the State, but also the distribution of deaths by age during the first year of life. It helps him to determine whether further reduction of the rate requires emphasis on improved obstetric care, hospital nursery care, or home care. It makes a big difference whether his logical move shall be to stimulate physician education or to increase his postnatal visits and emphasize his home sanitation program.

Should the State lend its much demanded and expensive mobile X-ray unit and team for 2 weeks to a completely rural county whose tuberculosis case and death rate has been the lowest in the State for years? If instead the time is allotted to an urban area with higher rates, will the value of the loan be enhanced by arranging for the unit to concentrate on those census tracts containing the lowest economic groups with crowded substandard housing even though the percentage of population screened is less than it would be if the service were directed to the well-regimented children of a cooperative school system? These questions can be answered when the proper data have been collected and properly analyzed.

In most public health programs we have passed the shotgun stage where we can do an unmeasured but vast amount of good by firing blindly out of any window. We are now in the marksman rifle stage. Particularly with our

straitened budgets in these high-cost days and with our almost permanent limitation of trained personnel, we must make every shot count. As we approach our solutions of public health problems, our target becomes ever a more closely defined one. And statistical analysis is, to continue the metaphor, our rifle sights.

Fiscal and Administrative Data

During the last several years Ohio has attempted to develop a basic formula to be used in the distribution of Federal grants-in-aid reallocated to qualified local health units. It was felt necessary that such distribution should be as objective as possible and should be guided only by pertinent factors such as population, financial need, public health problems. Such a formula has been devised and is being used, and, while the change to this system has caused difficulties, the ultimate system promises to be good. The important point is that the administrative people found themselves depending heavily upon the statistical people for this formula development. An even more important point is that the statistical people have discovered a rich field of inquiry in the governmental financial structure. This is not as far removed from the field of public health as it would seem, and it is certainly an area of keenest interest to the local health personnel.

While we may hope some day our investigations will suggest some sound answers to Ohio's budget questions, we have already foreseen another question begging solution—how to measure the effect, both psychological and program-wise, of Federal assistance. Foundations have for years pondered this question. I am not sure their tentative findings will be ours.

Statistics in Direct Services

Statistics aid the direct services of State health departments in the same way they do the local departments. In justifying a new program, the problem must be measured in size, in distribution, and in internal structure. The new program should be pre-evaluated, and the running controls of performance and achievement must be established with preparation of the most efficient data collection and analysis

mechanisms. Existing programs should periodically rejustify their existence and test the effectiveness of their methods. In Ohio, we have just finished reviewing the results of a small program on high nitrite concentrations in private water supplies. The percentage of private supplies showing significant concentration was too low to warrant the continuation of routine chemical laboratory tests. Related data showed little evidence of human effects and suggested that the judgment of the sanitarian in the field as to the circumstances surrounding the private supply was a better guide than laboratory tests and entailed no extra costs. We have stopped, therefore, doing routine nitrite tests on water samples from private supplies.

While statistical services to local units may be considered in great part educational, a direct service of the statistical unit to its own department is as a more formal educational resource. The close union of the State health department and the department of preventive medicine of the State medical school, where circumstances permit such alliance, is mutually beneficial. A respectful appreciation of quantitative medicine implanted in the minds and hearts of medical students will produce a healthy skepticism in the youthful reader of professional literature. It will in time improve the quality of such literature, and, not least, it will encourage understanding of community medicine, of disease reporting, and of kindred matters in a future ally—perhaps even a future colleague in the specialty.

Vital Statistics

The final role of statistics to be mentioned here is the traditional statutory one of the State registrar. There must be collected and preserved appropriate records of births, stillbirths, deaths, adoptions, legitimations, marriages, and divorces. In this connection, there must be close supervision of the functions of local registrars. The State registrar has gone far in perfecting his duties and his methodology. What remains in many places is the activation of his mine of information for more than the regular annual report. Many, if not most, of the program chiefs of the department will find

much in the registrar's data of concern to them in program planning.

The Biometrics Unit

The statistical or biometrics unit must naturally be under the direction of an experienced biometrician. We have had accomplished statisticians from other fields who find too much difficulty in understanding the problems and needs of the program chiefs. The biometrician must be capable with statistical tools, must have a reasonable understanding of the content and modus operandi of public health programs, and must have a sufficiently fluid imagination to develop means of applying his techniques to the subject.

The unit must have sufficient numbers of statistical clerks to handle the daily load of routine work. Some say this should be a mobile work force capable of assignment to whatever job is in present demand. Others point out the advantages of specialized statisticians or clerks within the unit, assigned more permanently to the work of particular programs. There is something to be said for both sides, and that decision is yet to be reached. The unit should, if possible, have a graphic artist, one who can translate into understandable visual aids the technical charts and tables.

Somewhere in the department there will be a machine-tabulating force, and almost always there will also be a clerical record-keeping unit to handle what the machines do not. Both of these facilities, if not in the biometrics unit, should be so closely associated as to avoid any gaps, either physical or mental.

The location of the biometrics unit in the State health department is a topic I approach with some hesitation. I do not know the answer. Some day I hope to. Certain principles must guide us, but the decision in any State depends ultimately not only on adherence to these principles, but also on the personalities involved and their relative abilities.

The principles are these: that the only purpose of organizational structure is to facilitate function and that the intradepartmental relations must therefore be based on services given

and obtained between various units in the structure. In Ohio, we have occasionally followed this practice: When the major portion of services goes to one major division of the department, the service unit is placed in that division and from there provides its lesser services to other divisions; when services are distributed fairly evenly to a number of major divisions, the service unit is located in the administrative center of the department, whether it be called the division of administration, the bureau of central services, or what.

Certainly, program chiefs and the biometrics chief should have direct access to each other. The only intervening factor may sometimes be a referee, one who can settle questions of priority and service distribution, particularly where resources are limited. The biometrics chief deals with each program chief, with the office of local health services in the correlation of services to local health units, and with the office that devotes its attention to research and to standards development.

In serving local health units, while biometrics goes through the office of local health services, it should go all the way through and actually visit local health units. It will do both sides good in understanding their common objectives. Occasionally, personnel of the biometrics unit may be the specialized personnel mentioned before who may be placed on temporary assignment to a local health unit to help in the establishment of a new record system or for other special problems.

The biometrics unit should have a fair degree of autonomy to pursue all these aims. But through the medium of staff meetings or planning conferences, it should be kept in close relation to the body of which it is a part. It will have outside relations, on the one hand with local health units, and on the other with the National Office of Vital Statistics and the epidemic intelligence group of the Public Health Service. With these latter Federal agencies, the unit will develop and maintain its functions in collecting and forwarding its share of national data for analysis and will in return look to these resources for consultation and assistance in special studies and problems.

As health officers and statisticians work

closely together, the similarity of their objectives will become more and more apparent. As we continue to confer, we will learn each other's idiom and our communications will be perfected. Out of the potpourri of disparate training we will get in public health a new generation with broad understandings and widened abilities.

REFERENCES

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Vocational Rehabilitation

Successful employment last year for 2,600 rehabilitated young civilian men and women with heart disease set a new record, the Office of Vocational Rehabilitation of the Federal Security Agency recently announced. The previous record was 2,300.

The average age of the worker in the group of 2,600 was 17 years when the disability became evident and 26 years when vocational rehabilitation was started.

At the beginning of the rehabilitation, 2,316, or 89 percent, of these men and women were unemployed. Forty-six were working on farms or helping with family work. Wage earners in jobs dangerous to their health numbered 288. The average wage of the working group was \$1,577. After vocational rehabilitation, 2,427, or 94 percent, were earning a yearly average of \$2,133. The remaining 158 were doing farm or family work for which no record of earning was available.

A new record was also set in rehabilitating into productive employment 5,696 men and women with hearing disabilities. About 1,500 of these persons were deaf, and 4,200 were hard of hearing.

Of particular significance in the rehabilitation program for the deaf was the extreme youth of the group, indicating that the State rehabilitation agencies are reaching many young people of school age and getting them ready for work before they run into job-finding difficulties that usually beset people who cannot hear. The average age of this group, 90 percent of whom were out of work when help was started, was 25.

Three out of five of the hard of hearing were out of work, and practically all the others were in danger of losing their jobs or were in unsuitable work. Their average age was 39.

As a group, the rehabilitants with hearing difficulties increased their earnings from about \$2.3 million a year to more than \$10 million the first year, an increase of 344 percent.